



Implementing Energy Efficiency Projects and Developing Climate Action Plans

Utility Bill Tracking and Analysis *Knowing Where and How Energy is Being Used at Your Facilities*

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Overview



- o Why Track Your Utility Bills?
- o Basic Definitions and Concepts
- o Getting Started
- o Methods of Energy Accounting
- o Means of Energy Accounting
- o Examples
- o Tips on Selecting Software
- o Pitfalls
- o Benchmarking
- o Resources



Why Track your Utility Bills?



- Record and attribute E consumption and costs
- Troubleshoot energy problems and billing errors
- Identify and implement energy efficiency (EE) capital improvement projects
- Evaluate program success and communicate results
- Forecast and budget more accurately

Without energy accounting, you can't manage your energy bills



Basic Definitions and Concept



- **Savings vs Cost Avoidance**
- **Energy** = Consumption = kWh or therms (~miles driven)
- **Demand** = Power = kW (~miles per hour)
- **Time-of-Use (TOU)** rates are designed to reward customers for shifting load to off peak periods.
- **Baseline** – amount of E used in a given time period for a specific facility or group of facilities
- **Benchmarking** – comparing one facility's E use or costs to similar facility types (e.g., fire stations)
 - \$ per square foot per year
 - Energy Use Index (EUI) – kWh/sf/year



Getting Started

- Considerations:
 - How E accounting info will be used
 - System of communication
 - What tools (inc. software) are needed
- Obtain necessary data



Methods of Energy Accounting

- Present-to-past comparison
- Multiple year monthly average
- Weather corrected method
 - Heating and cooling degree days (HDD & CDD)
- Correction for changing square footage

Means of Energy Accounting

○ Manual

TABLE 1

Energy Accounting Worksheet					
Facility: Fairfield School			Year: 1995		
Account: TPY 47 6209			Meter #: 2S5987		
Month	Usage kWh	Demand KW	Cost	Number of Days	Cost/Day
January	53,000	210	\$5,013.80	30	\$167
February	50,100	195	\$4,739.46	29	\$163
March	52,300	203	\$4,947.58	31	\$160
April	49,700	191	\$4,701.62	29	\$162
May	55,200	245	\$5,221.92	31	\$168
June	62,800	270	\$5,940.88	32	\$186
July	71,200	280	\$6,735.52	30	\$225
August	70,600	284	\$6,678.76	30	\$223
September	68,000	275	\$6,432.80	31	\$208
October	53,200	210	\$5,032.72	30	\$168
November	54,700	198	\$5,174.62	29	\$178
December	53,900	204	\$5,098.94	34	\$150
Total	694,700		\$65,718.62	366	\$180

Means of Energy Accounting (cont'd)



- Spreadsheet or Database
 - Excel or Access
- Commercial Software

Sample Summary

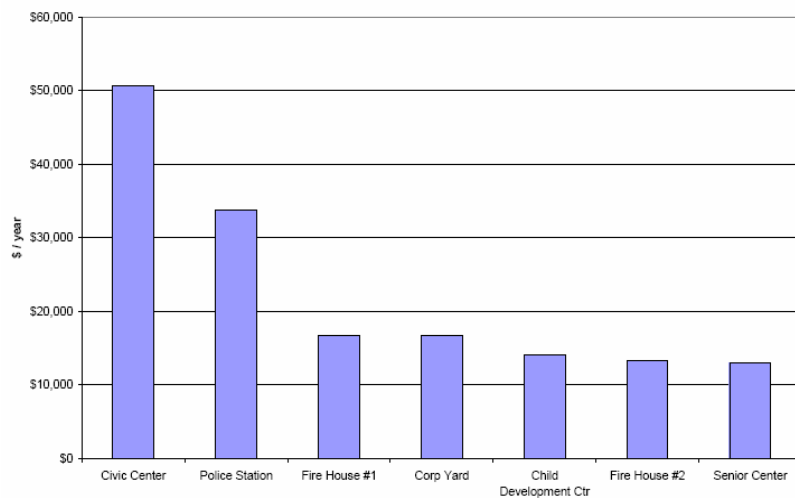
Facility Energy Summary - Sample City (Sorted by Annual Energy Cost)

May 2004 - May 2005

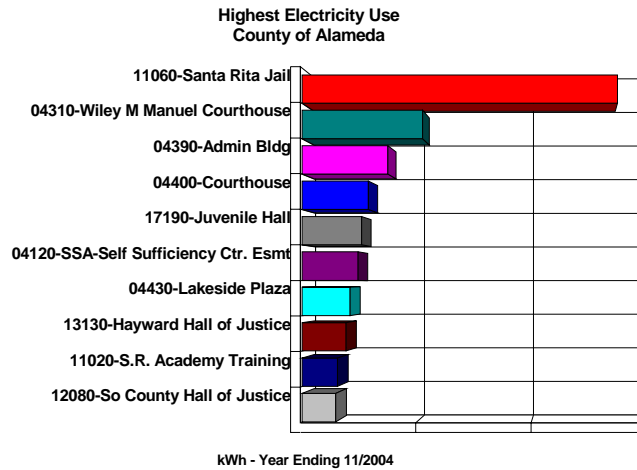
Facility Name	Address	Area (ft ²)	Peak Demand (kW)	Annual Electricity Use (kWh)	Annual Electricity Cost	Annual Gas Use (therms)	Annual Gas Cost	Annual Energy Cost	Energy Cost (\$/ft ² -yr)
Civic Center	1333 Solar Ave	24,350	93	303,712	\$42,204	8,254	\$8,425	\$50,629	\$2.08
Police Station	2449 Hydrogen St	12,090	59	226,240	\$31,155	2,418	\$2,576	\$33,731	\$2.79
Fire House #1	2333 Wind Lane	9,092	24	97,760	\$14,657	1,905	\$2,139	\$16,796	\$1.85
Corp Yard	5679 Nuclear Alley	48,324	82	87,242	\$13,973	2,454	\$2,810	\$16,783	\$0.35
Child Development Ctr	1220 Geothermal	11,500	32	66,970	\$10,120	3,902	\$4,037	\$14,157	\$1.23
Fire House #2	6303 Hydro Way	13,166		69,191	\$10,507	2,668	\$2,870	\$13,377	\$1.02
Senior Center	4321 Coal Blvd	12,500	13	34,013	\$5,250	7,700	\$7,684	\$12,934	\$1.03
Streetlights	Citywide		13	1,576,103	\$170,936			\$170,936	
Traffic Signals	Citywide			76,717	\$12,226			\$12,226	
Sewage Pump	3198 A St			55,895	\$6,564	0	\$124	\$6,688	
B AvePark	1550 B Ave			37,224	\$5,688			\$5,688	
Irrigation	Citywide			2,580	\$825			\$825	
Maximum Value		48,324	93	1,576,103	\$170,936	8,254	\$8,425	\$170,936	\$2.79
Minimum Value		9,092	13	2,580	\$825	0	\$124	\$825	\$0.35
Total		131,022		2,633,646	\$324,105	29,300	\$30,665	\$354,769	

Prioritize Facilities – example #1

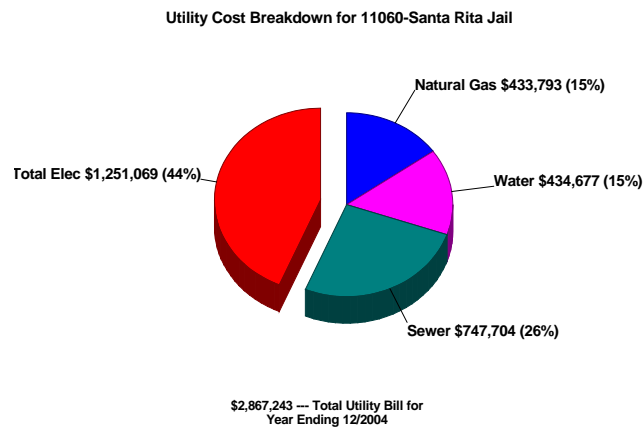
Figure 1: Annual Energy Costs per Facility



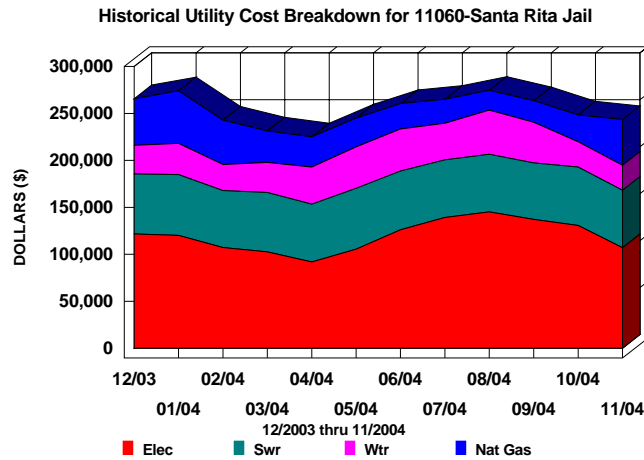
Prioritize Facilities – example #2



Disaggregate Utility Costs



View Historic Utility Trends



Billing Error Refunds

Building Number	Check Description	Date Received	Refund
			Amount
1501	Overcharge Refund: Inaccurate Demand Reading	03/06/95	\$13,205.03
1501	Overcharge Refund: Inaccurate Demand Reading	12/27/95	\$2,861.77
2392	Overcharge Refund: Inaccurate Rate Schedule	11/20/96	\$6,403.98
5511	Overcharge Refund: E-20 Rate Schedule	02/10/97	\$5,409.61
8121	Utility Tax Refund: City of Alameda	02/11/97	\$20,576.97
8121	Overcharge Refund: Power Factor Correction Error	08/13/97	\$1,898.35
1632	Overcharge Refund: Inaccurate Demand Reading	09/29/97	\$1,323.30
PGE	Overpayment Refund for AlcoPark	01/06/02	\$3,765.34
04120	Overcharge Refund: Inaccurate Demand Reading	09/27/03	\$59,969.08
07241	Refund Reimbursement: Central Health	01/19/05	\$7,853.44
02156	Refund Reimbursement: Berkeley Ct.	01/19/05	\$9,908.51
Total			\$133,175.38



Alameda County Energy Program



- o Matt Muniz, Energy Program Manager
- o Alameda County has >15 years of experience in tracking energy usage and costs
- o Annual energy cost avoidance as a result of energy projects equals >\$4.5 million
- o Received >\$9.0 million in energy incentives and refunds from PG&E and the CEC
- o Established PG&E online billing payment system (EDI) for >180 electric and natural gas bills - June 2001
- o Established EBMUD online billing payment system for >75 water bills - April 2002

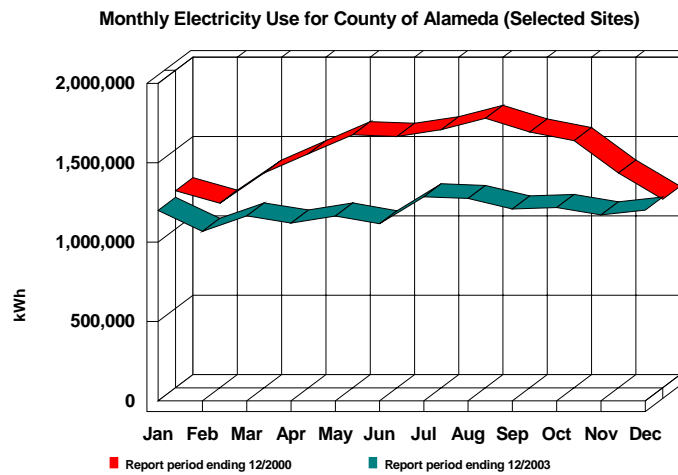


Example of Utility Bill Processing: From Receipt to Payment

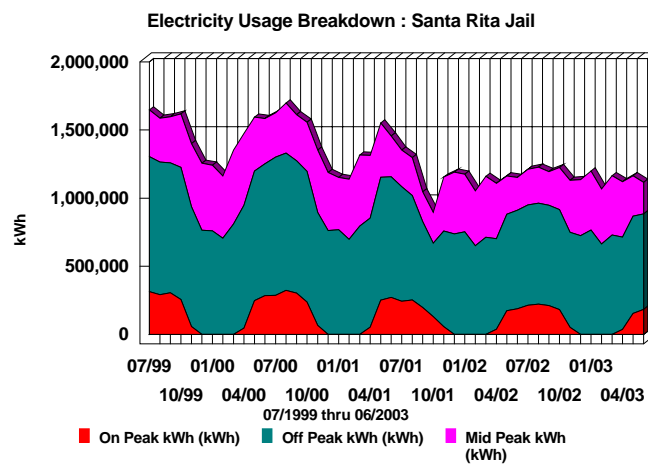


- o PG&E electronically posts billing information
- o Staff downloads this information using desktop EDI translation software (2X per month)
- o Staff imports usage and cost information into its utility manager software
- o Staff identifies, audits, and reconciles any billing errors
- o Staff approves and exports billing cost information to the accounting software
- o Auditor receives billing cost information and approves electronic payments
- o Staff electronically forwards payment to its bank
- o County's bank electronically sends bill to PG&E bank

Post-Project Measurement & Verification (M&V)



Post-Project M&V - cont'd





Tips on Selecting Software



- Know your applications and needs
- Talk to users of software
- Know what support you are buying
- Don't compromise on important features



Biggest Pitfalls



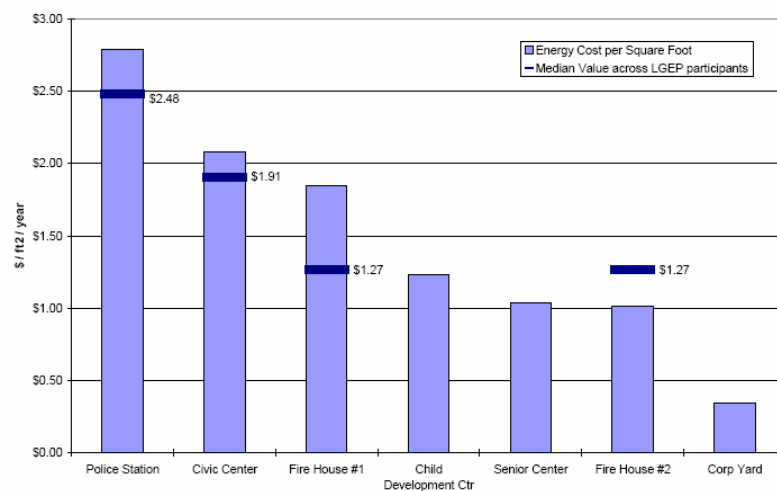
- Lack of staff time and commitment
- Failure to communicate results to the right people

Why Track your Utility Bills? (redux)

- o Record and attribute E consumption and costs
- o Troubleshoot energy problems and billing errors
- o Identify and implement energy efficiency (EE) capital improvement projects
 - o **Incorporate benchmarking**
- o Evaluate program success and communicate results
- o Forecast and budget more accurately

Benchmarking example

Figure 2: Annual Energy Costs per Square Foot





Some Common EA Software



- Utility Manager www.utilityaccounting.com
- Metrix www.abraxasenergy.com
- Energy Cap www.goodstewardsoftware.com
 - Previously FASER



CEC Handbooks for EE



- Energy Accounting: A Key Tool in Managing E Costs
- How to Hire an E Auditor to Identify EE Projects
- How to Finance Public Sector EE Projects
- How to Hire a Construction Manager for Your EE Projects
- How to Hire an ESCO
- Summary of ESCOs – Summary of Responses